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Precision Instruments

PRODUCTION OF PRECISION SCALES IN CHINA

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One-ten millionth of one Gram Super Precision Scales

Recently China has been achieving considerable success in producing precision scales, which are thus far manufactured in only a few countries of the world. The most noteworthy one among them is the vacuum-quartz small-quantity heat scales, whose production, in small numbers, was begun this year at the Shenyang City Glass Laboratory. It is a super-precision balance which has a minimum sensitivity of one-ten millionth of one gram. Test production of these scales was achieved by the Metal Laboratory of the Chinese Academy of Science, and the Shenyang City Glass Laboratory began their manufacture.

In a scientific laboratory test, the variation of mass must be observed often under the condition of vacuum and/or of high heat. Such variation is extremely small and is difficult to measure without the help of a highly elaborate balance. The precision small-quantity scales hitherto produced by China had had a minimum sensitivity of one-millionth of one gram. Although this balance was so elaborate as to weigh even a piece of cotton fiber or an ink spot on a piece of paper, it was unable to meet necessities adequately.

The smallest weight used for the newly-produced quartz small-quantity heat balance, which has a minimum sensitivity of one-ten millionth of one gram, weighs 0.01 mg and is finer than human down; and during the operation it could be blown away unless the operator stops his breath. This balance is composed of three parts, namely, vacuum, heat, and balance. The parts of the balance are set in the vacuum system, are resistent to high temperature and corrosion, and are made of quartz glass which has a very small factor of expansion. The balance can measure metal or high temperature test material which is heated to 1,000 degrees centigrade, and the sensitivity and accuracy of the balance are not at all affected even by carbondioxide or steam.

One-millionth of one Gram Precision Scales
Produced by the Peking Optical Instrument Manufactory

Although the above points out an epochmaking achievement in the recent meter industry in China, the precision small-quantity scales with minimum sensitivity of one-millionth of one gram are produced at the Peking Optical Instrument Manufactory and the Shanghai Scales Manufactory.

According to the Jenmin Chipao of January 24, 1966, the Peking Optical Instrument Manufactory succeeded prior to this spring (January of the lunar calendar) [sic] in the test production of high-precision balance which has a maximum weighing capacity of 20 grams. According to the report, the production of this high-precision balance was said to have been possible only after the ideological struggle of whether or not to tackle the heavy burden of revolution and achieve a high technological standard. Half a

year prior to this, the National Meter Bureau requested this factory to present a test product of a super high-precision scales. Then there were a variety of opinions: some supported the request; some were skeptical about its success; others argued that such a high-precision balance was produced only in a few countries of the world and that their factory was not equipped with the necessary means to produce such scales; and still others maintained that the precision scales hitherto produced in China reached barely the third-class standard, and a high technological standard should be achieved step by step; hence second- and the first-class test products should precede the super-class test product. However, it is said that meanwhile a movement to study the thought of Mao Tse-tung was launched and the spirit to overcome difficulties to produce this super-class precision balance was generated. Thus the key engineers began to review the up-to-date experiences of the test production of precision small-quantity scales; and by making the best use of the valuable results of experiences, they finally succeeded in designing a blueprint for the high-precision balance. The craftsmen are reported to have succeeded after a series of trials in the test production of all the 400-odd parts needed to make a high-precision balance in approximately half a year.

One-millionth of one Gram Scales Produced by the Shanghai Scales Manufactory

According to a telegram dispatched by the New China [News] Agency from Shanghai on October 17, 1965, the Shanghai Scales Manufactory also succeeded in producing a precision small-quantity balance which has a minimum sensitivity of one-millionth of one gram and a maximum weighing capacity of 2 grams.

The weight used for this precision small-quantity scales is smaller than a grain of white confectioners' sugar crystal and can be blown away even by a single careless breath. The balance has a very keen sensitivity, and when it is approached by a hand, it is able to sense even so slight a variation of weight as is caused by the body temperature of man. Consequently, the balance is kept in a controlled-temperature room with a separator attached outside. Both the materials to be weighed and the weights to be used are carried in through two "windows" by the revolving pan of the scales. The windows are always closed and the switch is controlled completely from the outside. This precision balance is used by a national meter certification authority for the measurement of standard weight; apart from this, it is necessary for the laboratories and test rooms of scientific research organizations, universities, and professional schools when they measure the mass of a matter.

The Shanghai Scales Manufactory which produced this balance also manufactured in 1960 a small-quantity balance which was capable of weighing one-two hundred thousandth of one gram. Subsequently, in early 1963, it received a mission for test production of one-millionth of one gram precision small-quantity balance and succeeded in its test production in late 1964. According to the above-mentioned source, in foreign countries, copper

and aluminium are used for the beam of a precision balance, but the engineers of the factory have made the beam using a more ideal material. This material is said to be relatively light and to have a high degree of mechanical proof, and the effect of heat upon this material to be relatively small. The manufacture has a margin of error of about one graduation (one-millionth of one gram), and this index is a considerably advanced one even by international standards.

In the course of the test production, both the engineers and the workers made great efforts to overcome the difficulties associated with revisional test. The test, of course, must be conducted in a controlled-temperature room, whose temperature must be fairly high. Since there was no temperature-control facility in the factory, they built a simple such facility through their own efforts. As a result of their experiments, they also discovered a comprehensive method of testing a precision small-quantity scales, and thus prepared the necessary condition for the formal production of this manufacture henceforth.

Shanghai Linung Scales Manufactory and Shenyang Teko Scales Manufactory

Among other factories which have been promoting the production of high precision scales are Shanghai Linung Scales Manufactory and Shenyang Teko Scales Manufactory.

Early last year the Shanghai Linung Scales Manufactory manufactured three kinds of high precision standard scales with a large weighing capacity, each having a load capacity of 1 kg, 5 kg, and 20 kg. These standard scales are the precision gauges necessary for the mining industry, scientific research organizations, and the laboratories of universities and professional schools; their respective graduation units are 0.5 mg, 2.5 mg, and 10 mg; and each of them has the precision of one-two millionth of its full scale. For example, when a 1 kg material is weighed by the 1 kg scales, even the additional weight of 1.6 cm-long hair is immediately indicated on the scales.

It is the Teko Scales Manufactory of the Shenyang City which succeeded in producing China's first second-class 5 kg balance and first-class 1 kg balance, having been enlightened by Shanghai Linung Scales Manufactory which is a sister factory of the former. Although the Shenyang factory is one of the factories in China which started to produce scales relatively early, it could, until 1965, produce only fifth-class scales of comparatively low accuracy. Hence early last year, on the occasion of reviewing the performance of the factory, various questions were raised and answers were sought on its inability to produce high-precision scales above the fourth class.

Traditionally, the scales produced by this factory were an imitation of foreign products; and because of their complicated structure, much material was wasted and not only was the cost of production high, but also the quality of the products was relatively inferior. Within the last few years, the factory carried out a number of improvements, yet was unable to achieve a significant breakthrough. Some people thought that it was no

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mistake to imitate foreigners because the latter had several decades of experience in scales production, whereas they themselves were still young, inexperienced, and lacked in expertise and suitable facilities. Against such spiritual state, however, the factory branch of the Chinese Communist Party organized the employees of the factory so that they should learn the relevant writings of Chairman Mao; and thus by liberating their thoughts and elevating their recognition, it succeeded in producing, with a single leap a fourth-class 5 kg balance. Then some leading members of its management who were satisfied at this result, took a strong pride in their achievement.

Before long, however, a group of the "union of the three" -- the leading members of management headed by the vice chief of the factory, Chang Chung-Fu, technicians, and laborers -- visited Shanghai Linung Scales Manufactory, which had been a long-time competitor of the Shenyang Teko Scales Manufactory, for an observational study. They were very surprised at learning that the Shanghai factory was producing third-class 5 kg scales. Upon returning to their factory, they rallied all their vigor in order to produce second and first-class scales by leaping over the barriers of producing third-class scales, and commenced the engineering and test-production activities for second-class 5 kg and first-class 1 kg scales, organizing a small team of the "union of the three" for the test production of new manufactures. Owing to the herioc ambition of the employees to overtake and bypass the advanced plants and to their clear understanding of the significance of catching up at a bound even the seemingly insolvable problems confronted in the course of engineering and test production were smoothly solved and the two kinds of high-precision scales, which until then China had never been able to produce, and which were urgently needed for scientific research organizations and the department of weights and measures, were produced in only three months.

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A precision small-quantity balance manufactured by the Shanghai Scales Instrument Manufactory with a minimum sensitivity of one-millionth of a gram and a maximum load capacity of two grams.

Precision balance, Model WT2B manufactured by the Peking Optical Instrument Manufactory. It has a maximum scale capacity of 20 grams, and a minimum reading value of 0.01 mg.

Precision balance, Model GT2A produced by the Peking Optical Instrument Manufactory. It has a maximum scale load of 200 g. and a minimum reading value of 0.1 mg.

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RAPIDLY PROGRESSING CHEMICAL FERTILIZER PRODUCTION

Development of a Unique Chinese Way
Through Technical Innovation

Currently a great task of Chinese industry is to support agriculture, and the production of chemical fertilizer occupies an important place in this task. This year, as also last year, promises rich harvest of wheat; and chemical fertilizer is an important factor in this regard.

On the other hand, the export of fertilizer has always occupied the foremost place in Japan-China trade. Inasmuch as export to China amounts to 40 percent of the total Japanese export, Japan seems to be considerably interested in China's chemical fertilizer industry. Since chemical fertilizer was already dealt with in number 55 (November 1, 1965) of this Report, this issue will treat the major movements of this year.

> During January-May, the Production [of Chemical Fertilizer] Increased 500,000 Tons Over [the Figure Set in] the National Plan.

This year, China's chemical fertilizer production progressed even further. During January-May, the daily output level of chemical fertilizer rose conspicuously above that of last quarter, which had had the highest level of last year; and overall 500,000 tons of chemical fertilizer were produced above the level set in the National Plan (a telegram dispatched by the New China News Agency on June 9, 1966). The quality of nitrogenous manure has been stabilized and the quality of phosphatic manure has been further elevated. The consumption of electric power, raw materials, and other materials is generally lowered and the cost of production decreased.

The nitrogenous manure produced in Shanghai during January-May this year shows a 40-odd percent increase compared with the same period of last year, and during January-February, Kuangchou, [illegible] too, produced nitrogenous manure 60-odd percent more than in the same period last year.

This year all [illegible] (large-scale, medium-sized, and small) [illegible] chemical fertilizer plants scattered in various districts of China have achieved a production increase through the movement of "bringing politics to the fore" and of studying the works of Mao Tse-tung, and are making new change in enterprise. Advanced plants are continuously maintaining a stable, high rate of production this year, and are making further progress; hitherto relatively retarded plants are rapidly advancing to catch up with the advanced ones; and thus great strides are being made in the over all production level. The new plants are rapidly reaching advanced engineering standards with a vigor to bypass all the others, and some of them are even ahead of older plants by breaking the traditional frame. For several years,

a variety of technical innovations introduced by the Chinese chemical fertilizer industry has been all the more widely and systematically adopted, and unique Chinese production techniques, facilities, and management methods are bearing fruits.

Tanyang Chemical Fertilizer Plant Succeeded in Devising a New Chinese Way of Production Process

At the end of January, it was reported that the new nitrogenous manure production process, which had been successfully developed by the Shanghai Academy of Chemical Engineering, Peking Chemical Engineering Laboratory, and the ~~Chiangsu sheng~~ KIANGSU PROVINCE Tanyang Chemical Fertilizer Plant, after several years of research under the direction of an eminent Chinese chemist Mr. Hou Te-pang, was recognized as technically advanced and economically reasonable after a comprehensive technical examination conducted by the Ministry of Chemical Industry in accordance with the request of the National Science Commission.

Compared with traditional ones, this new process requires shorter production process, less materials and fewer facilities, less capital investment for basic construction, shorter working period for plant construction, and less consumption of raw materials for generating power. Judging from the example of the Tanyang Chemical Fertilizer Plant, the construction of a small plant with the annual production capacity of 5,000 tons of synthetic ammonia takes ordinarily about a year and a half and costs only 7 million Yuan of investment capital, which is approximately half of the capital needed for the construction of an old-process plant.

The bicarbonate of ammonia produced through this new process is a solid chemical fertilizer which contains only about 17.5 % of nitrogen; it is soluble in water, almost neutral, and harmless to the soil. Since it contains carbon dioxide, it is easily absorbed by the roots of agricultural crops and is advantageous to their growth. According to several years' experiments conducted by agricultural science authorities and the results of its application to large agricultural areas, this fertilizer, if used properly, has proved to be as effective as nitrogenous manure. The only problem is that since the bicarbonate of ammonia is easily soluble, relatively more precaution is required for its packing and use.

Application of the Tanyang-type New Process to Large Plants

Although this new process has been spreading among small plants of various districts, it is now being adopted for the construction of large-scale and medium-size nitrogenous manure plants. The view of the authorities is that although the adoption of China's new process in manufacturing bicarbonate of ammonia has already been making considerable progress, it would have to make further progress in order to meet the agricultural demand for nitrogenous manure. Consequently, research on various problems connected with bicarbonate of ammonia is currently being promoted more systematically, so that its production is further economically and effectively stabilized and its use is being made more rational.

As for the Tanyang Fertilizer Plant itself, the projected production capacity for synthetic ammonia was 2,000 tons in 1963 (the actual accomplishment was 2,600 tons of synthetic ammonia, and 10,000 tons of bicarbonate of ammonia); in July 1964 the projected annual production capacity was raised to 5,000 tons for synthetic ammonia and to 20,000 tons for bicarbonate of ammonia; likewise in the first quarter of 1965 it rose to 6,500 tons and 26,000 tons respectively; and in the second quarter of the same year it made a further stride toward the level of 8,000 tons and 32,000 tons respectively.

China Tackles 70-odd new Technological Developments This Year.

This year, new technological developments, for which throughout the nation chemical fertilizer plants are selectively promoting experiment and research by adopting the methods of the "internal" union of the three — the leading management staff, engineers, and workers — and the "external" union of the three — the plants, scientific research organizations, and universities and professional schools — amount to a total of 70 items.

These include new techniques for the shortening of the production process, simplification of facilities, and optimum utilization of local raw materials. Currently, those plants which have acquired these techniques are already reaping elementary fruits, and some are planning to acquire these techniques. It is deemed that the technical level of China's chemical fertilizer production will enter a new stage when these new techniques are accomplished.

The Gas Generator is the Neck of the Nitrogenous Manure Plant.

This year the popular movement for technological innovation and technological revolution has added further depth and breadth. Employees have made many revolutionary proposals on the neck of production and are effectuating production efficiency. In the production of nitrogenous fertilizer, the gas generator and compressor are the major facilities for manufacturing synthetic ammonia. Since last year, however, in nitrogenous manure plants everywhere, the production efficiency of the gas generator has not been able to keep pace with that of the compressor owing to the latter's overall elevation, and this has come to restrict the production increase of ammonia. The solution of this problem is indeed the key to this year's production increase. Therefore, in order to cope with this crucial issue, the chemical fertilizer plants of various districts are propagating technological innovations through broad mobilization of masses.

Previously, the gas manufacturing workshop of the Nanking Chemical Fertilizer Plant operated according to old standards, and the coal-bed inside the gas generator was so low as to be easily blown off. As a result of earnest research, the technical staff of the factory concluded that the above facts were responsible for hampering production increase. After much experimentation, they discovered a new method of operation, that is, "high coal-bed, high wind-pressure, and high generator temperature." Since the

adoption of this new method of operation for every gas generator in all workshops, productivity has risen more than 30 percent. The employees of chemical fertilizer plants of all districts have been raising the productivity of the gas generator by increasing the time for gas production with a minimum break of the generator. Currently, the goal of one compressor for one gas generator is realized in nearly every plant; some plants have "9 compressors for 7 gas generators"; and thus the production capacity of synthetic ammonia is being raised in all aspects.

Productivity is Raised Tremendously by Every Plant in Shanghai.

The large Shanghai Wuching Chemical Fertilizer Plant, which was built by China's own efforts, has been conducting continuous research to improve its facilities and manufacturing methods. As a result, its present productivity of ammonia is twice as high as originally projected production capacity. The present productivity of small chemical fertilizer plants scattered in the suburbs of Shanghai is an annual production of 3,000 tons of ammonia as compared with the projected original capacity of annual production which was 800 tons of ammonia. For several years these chemical fertilizer plants have encouraged technological innovation and revolution, and have dug out the potential of their facilities. Since the second half of last year, the employees of these small chemical fertilizer plants have been breaking superstition more boldly than ever: they improved the synthetic towers which had been regarded as taboo and had been called the "tiger's tail." The leadership of the authorities of Shanghai City has selected experienced laborers and technicians from various factories and improved the factories one by one, making a concentrated attack on superstition. Presently in such factories as Chiating, Putung, Nanhui, etc., the productivity of the improved ammonia synthetic towers is generally 20 %-30 % higher than the originally projected level.

Reconstruction of the Old-type Ammonia Synthetic Tower.

As for the reconstruction of the old-type ammonia synthetic tower, the Thermal Engineering Study and Research Team of the Department of Power Machines of Chinghua University, which collaborated with a chemical plant in ~~Szechuan sheng~~ SZECHWAN PROVINCE, succeeded in developing a new method. This study team discovered that the low productivity of the ammonia synthetic tower of the fertilizer plant was responsible for the weakness of current chemical fertilizer production when it investigated the plant in 1963 in order to unite study with production. Thereupon, the team began to tackle the problem of reconstructing the ammonia synthetic tower; and after a successful research, it went back to the chemical plant in ~~Szechuan~~ SZECHWAN in order to work out a technical reconstruction of the synthetic tower in cooperation with the plant. At first, however, some staff of the plant held the view that it would be better to construct a new modern synthetic tower than to reconstruct painstakingly the old-style synthetic tower of 1940.

Those professors and students of Chinghua University and the workers and technicians of the chemical plant who participated in this technical reconstruction work determined to open a unique way based on the reality and necessity of China. There is a considerable number of this type of old synthetic towers in China. If they can successfully reconstruct one old-type synthetic tower, the reconstruction of all old-type synthetic towers will be accelerated, and the amount of China's chemical fertilizer production will be raised. ~~And~~ this has a greater significance than constructing new synthetic towers of complex structure.

Reconstruction of Synthetic Tower Without the Help of Foreign Writings.

In this technical reconstruction, they discovered through their elementary research that the low productivity of old-type synthetic tower was due to an inadequate conductivity of heat. They tried to increase thermal conductivity according to a method described in a foreign book; however, after a realistic research, they realized that with such a method described in the foreign book, they could not truly solve the problem of thermal conductivity related to this kind of synthetic tower. Thereupon, through a detailed analysis in accordance with the operating conditions of the old-type synthetic towers, they grasped the main contradiction of thermal conductivity and created a new method.

According to this new method, they set out the first technical reconstruction of an old-type synthetic tower, but the productivity did not increase much though thermal conductivity was strengthened. Some attributed this to excessively good thermal conductivity. Afterwards, however, they discovered through a research on the basic data that the productivity had not increased in spite of the increase in thermal conductivity because related problems had not been concurrently solved, and that the main contradiction upon adopting a newly-built reaction tower had already been moved to the related problems. Therefore, they concentrated their efforts on solving the problems related to thermal conductivity. Thus, through the second technical reconstruction, the daily productivity of this old-type reaction tower has come to bypass the advanced world standard.

Furthermore, in summing up the practical experience of the two previous technical reconstructions, they discovered a structural defect which had not been completely solved even with the second technical reconstruction. Therefore, more improvements were needed from structural point of view. However, no clues to the solution of this problem were found in current foreign writings. Yet they were all the more determined to achieve something which had never been done by foreigners, and in the end with the help of the wisdom of many they succeeded in devising a new structure. Thus at last in its productivity, the old-type synthetic tower of the 1940's has come to be ahead of the new-type synthetic tower of the 1960's and reached the advanced standard of the world.

No. 72, July 15, 1966.

Old-type Synthetic Towers Throughout the Country Undergo Technical Reconstruction Through the Chinghua University Method.

This technical reconstruction was begun in May 1964 and completed in October 1965. As a result of the technical reconstruction, the productivity of old-type installation rose by more than 70 percent, and the quantity of ammonia production of the entire plants increased a great deal. This technical reconstruction, which is implemented together with a great repair work for the ammonia synthetic tower, requires no great deal of money, needs only a short period of production suspension, has a great effect upon production increase, and yet is easily diffused. Currently many synthetic towers of the same type throughout the country are adopting the reconstruction methods of this chemical plant, promoting a partial technical reconstruction, although there is a degree of differences among different towers, all of them are achieving success in increasing production. The joint conference of National Economic Commission, National Science Commission, the Ministry of Chemical Engineering, the Ministry of Higher Education, and the Chinese Academy of Science which convened around last February, confirmed the significance of this reconstruction method particularly for economic construction.

Some Technological Achievements of Small Plants Are More Advanced Than Those of Large Plants.

KIANGSU PROVINCE

The aforementioned new process of the small nitrogenous manure plant with annual productive capacity of 2,000 tons, which was successfully introduced by ~~Chiangsu-sheng~~ KIANGSU PROVINCE Tanyang Chemical Fertilizer Plant, has been hardening its basis among small plants. These newly-built small plants have advantages in experimenting in new techniques of production because they are small in scale and easily movable. After succeeding in the experimentation of the new process, within the last several years these plants succeeded in the creation of many new techniques and facilities by adopting the method of the "union of the three" both within and outside the plants, raised the technological standard of China's synthetic ammonia industry a step further, and made a significant improvement of the new process of chemical fertilizer production, which was devised for the first time by the Chinese. Presently some of the new techniques, manufacturing methods, and facilities which are widely adopted by small-size nitrogenous manure plants are already advanced more than those which are employed by large-scale plants. Since the scientific researchers of the engineering division of various districts have always been working closely with their employees in plants, any technical achievement obtained in the course of production has been immediately utilized for engineering. Thus they have been able to revise the engineering project for a small-type nitrogenous manure plant constantly so as to make it economically more rational and technically more advanced. At the present time, the small nitrogenous manure plant needs much less investment capital for its construction and its construction speed has become much faster than ever. It takes only half a year to build a

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small-size plant and eight to ten months for a slightly larger plant. The capital for the construction of such small plants is managed by each Sheng (PROVINCE), and also the manufacturing of facilities, engineering, and installations, too, are solved by many Shengs and cities. Although until several years ago only a few industrially relatively advanced Shengs and cities were able to engineer and manufacture themselves a complete set of chemical fertilizer facilities, today most districts have an engineering organization and a professional engineering corps and are greatly reinforcing the manufacturing capacity for chemical fertilizer. Some Shengs are producing a set of chemical fertilizer facilities by a method of cooperative division of labor, organizing several tens or nearly a hundred medium-size and small-size local machine factories. Currently the main facilities for small nitrogenous manure plants are all self-supported in large districts or Shengs except several Shengs and autonomous districts.

Small Plants Occupy Eighteen Percent of Nitrogenous Manure Production.

During January-May this year, 20-odd newly-built small nitrogenous manure plants in China began production; furthermore, the construction of a group of small plants is being accelerated and they are expected to begin production one after another this year and next. When all these new plants begin production, the productive capacity is expected to rise far above the annual productivity of small nitrogenous manure plants hitherto possessed by China.

Since 1961, the productive capacity of small nitrogenous manure plants has been doubled almost every year, and the ratio of which the small plants occupies in the national total of nitrogenous manure production has increased every year: in 1961 the total amount of production by small nitrogenous manure plants occupied only 2 % of the national total, yet in 1965 it rose to 12.4 %; and this year it is expected to reach 18 % (a July 14, 1966 telegram from New China News Agency).

Improvement of the Quality of Phosphatic Manure and of the Utility of Phosphorite

The main task of this year in the production of phosphatic manure is to continuously raise the quality of phosphate and the utility of phosphorite powder. Although most of the phosphorite powders used at the phosphatic manure plants of various districts were of relatively bad quality and were low quality mineral powders, the quality of phosphate has been improved, and the ratio of the first-class phosphatic manure increased a great deal. The convertibility in phosphate production rose 3 % everywhere as compared with last year, and the phosphorite powder is more effectively used than ever. The products of Kunyang Phosphatic Manure Plant in Yunnan-sheng were traditionally of relatively bad quality and their convertibility was low. They used to think that they could not manufacture first-class products because of bad raw materials and facilities; however, this year, as a result of a socialist education movement, not only the first have been produced but also the convertibility has been tremendously increased. The instructors and students of the Chechiang (CHEKIANG) Academy of Chemical Engineering discovered a new manufacturing

method to increase the production of phosphatic manure through cooperation with the Nanking Phosphatic Manure Plant and with a related research unit. With this method it is possible to increase the effective content of phosphorus even with relatively simple facilities; furthermore, phosphatic manure can be shipped after 3-6 days of maturity, and it is unnecessary to build a large warehouse for maturation. With this method, the effective content of phosphorus becomes more than 20 percent.

The Movement of the Chemical Fertilizer Plants in Each Sheng.

Since the current situation of the medium-size and small-size chemical fertilizer plants up to last year has been introduced in the issue No. 55 (November 1, 1965) of this report, in the following the news from various districts which appeared this year is dealt with.

Hunan-sheng Chuchou Chemical Fertilizer Plant

Recently began its operation formally (New China News Agency, January 26, 1966). This large-scale modern plant with an annual production capacity of 200,000 tons of superphosphatic lime was engineered and built entirely by Chinese; its facilities also are Chinese-manufactured.

HUPEH ~~Hupei~~-sheng

HUPEH PROVINCE ~~Hupei-sheng~~, A small chemical fertilizer plant, which was newly built in Tienmen hsien, has recently begun to produce bicarbonate of ammonium (New China News Agency, May 15, 1966). This plant can produce 12,000-odd tons of bicarbonate of ammonia a year.

ANHWEI Anhui-sheng

ANHWEI PROVINCE ~~Anhui-sheng~~ Four small recently-built chemical fertilizer plants in ~~Anhui-sheng~~ have formally begun production (New China News Agency, March 23, 1966). Including those plants which had been built prior to these four plants, there are now 12 small-size chemical fertilizer plants in ANHWEI ~~Anhui~~-sheng, and 160,000 tons of chemical fertilizer can be produced annually by these plants. These four newly-built plants are scattered in the rich rice crop district of the southern bank of Chang Chiang (Yangtzu River), the Shih-hang irrigation area of Chianghuai Pi and the low food crop area of the Huaipei plain; they can produce nearly 30,000 tons of liquid ammonia and bicarbonate of ammonia a year. The engineering, construction and the training of technicians for these four plants were accomplished all by the assistance from old plants. Therefore their construction was so fast as to be completed and to begin operation generally in only 6-7 months, which was 3-4 months shorter than the original plan, ~~and~~ on the average each plant saved approximately 10 % of the investment capital originally planned; also, the works were so magnificently performed that every plant succeeded in a single trial run.

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KWANGTUNG
~~Kuangtung~~-sheng

A new chemical fertilizer ammoniated superphosphatic lime has formally begun to be produced by Kuangchou Nitrogenous Manure Plant. The facilities for this new fertilizer production were engineered, manufactured, and installed by the employees of the plant.

This year the Kuangtung-sheng Chinese Merchant Investment Company will construct ten chemical fertilizer plants in special districts, such as Shanshan, Meihsien, Huiyang, Chanchiang, Hainan, etc. Each of these plants will have an annual output capacity of 3,000-5,000 tons. Last year the company built the Meihsien Phosphatic Manure Plant, the Taishan-hsien Huachiao (Chinese Merchant) Chemical Fertilizer Plant, the Huichou Phosphatic Manure Plant, and the Kaiping Nitrogenous Manure Plant which has a projected annual production capacity of 25,000, ~~and~~ all of them are in operation.

A soluble phosphatic manure plant in Maoming City having an annual production capacity of 60,000 tons began to operate in early March; its daily output has become as much as projected; effective content of phosphorus is 18 % plus; and all are first-class products.

Although the annual production of the Hsingning General Chemical Engineering Plant was 400-odd tons of superphosphatic lime in 1960 when it was established, today its annual production amounts to 20,000 tons; most products are of qualified standard; and the cost of production is at three-fourths of the beginning period.

The first nitrogenous manure plant of the Special District of Shantou, the Hsinghuo Nitrogen Plant, began its operation formally on February 10, 1966. Its annual production capacity is 3,000 tons of synthetic ammonia (liquid ammonia 12,000 tons). The plant was built with support from many quarters and completed only in 8 months.

Yunnan-sheng

The five newly-built or expanded soluble phosphatic manure plants in Yunnan-sheng are beginning to operate one after another (New China News Agency, March 28, 1966). These are located in Hsuanwei, Chuhsiung, Yuchi, Chinning, and Anning; and when these plants formally commence their operation, this Sheng's production capacity of soluble phosphatic manure will be nearly tripled.

TSINGHAI
Chinghai-sheng

The first nitrogenous manure plant of ~~Chinghai~~-sheng began production in Hsining on January 1, 1966. Prior to this, in this Sheng there were a phosphatic manure plant which utilizes the bones of sheep and cattle, and a chloric fertilizer plant utilizing water from a local salt lake. The new plant produces mainly liquid ammonia and bicarbonate of ammonia. Part of the facilities of this plant was manufactured by the machine industry of Chinghai-sheng, and the rest were made in Shanghai.

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Chemical Fertilizer plant. Kung-jen Jih-pao, 15 June 1966.
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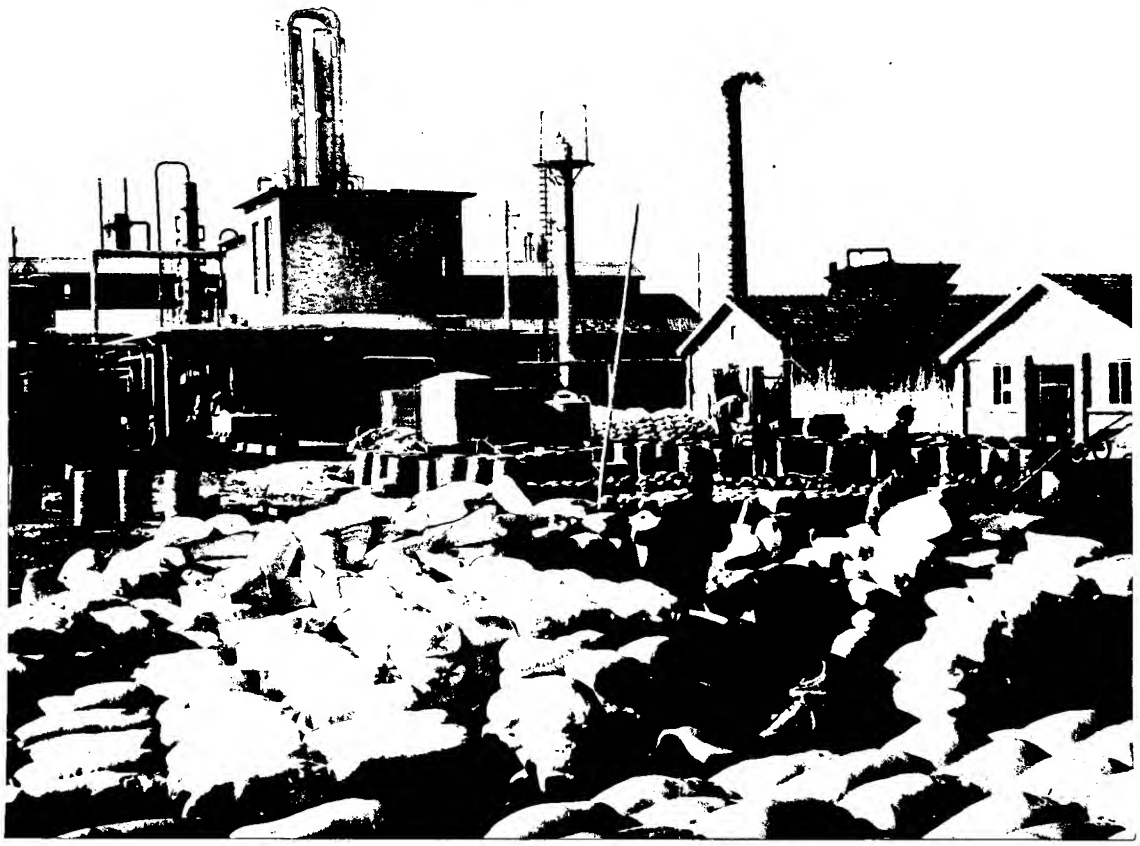

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25X1 CHINA [redacted] TA-TUNG 40 06 N 113 17 E
Small Nitrogenous Manure Plt. 1966. [redacted]
Confidential (7,15) CIA 1145603 25X1

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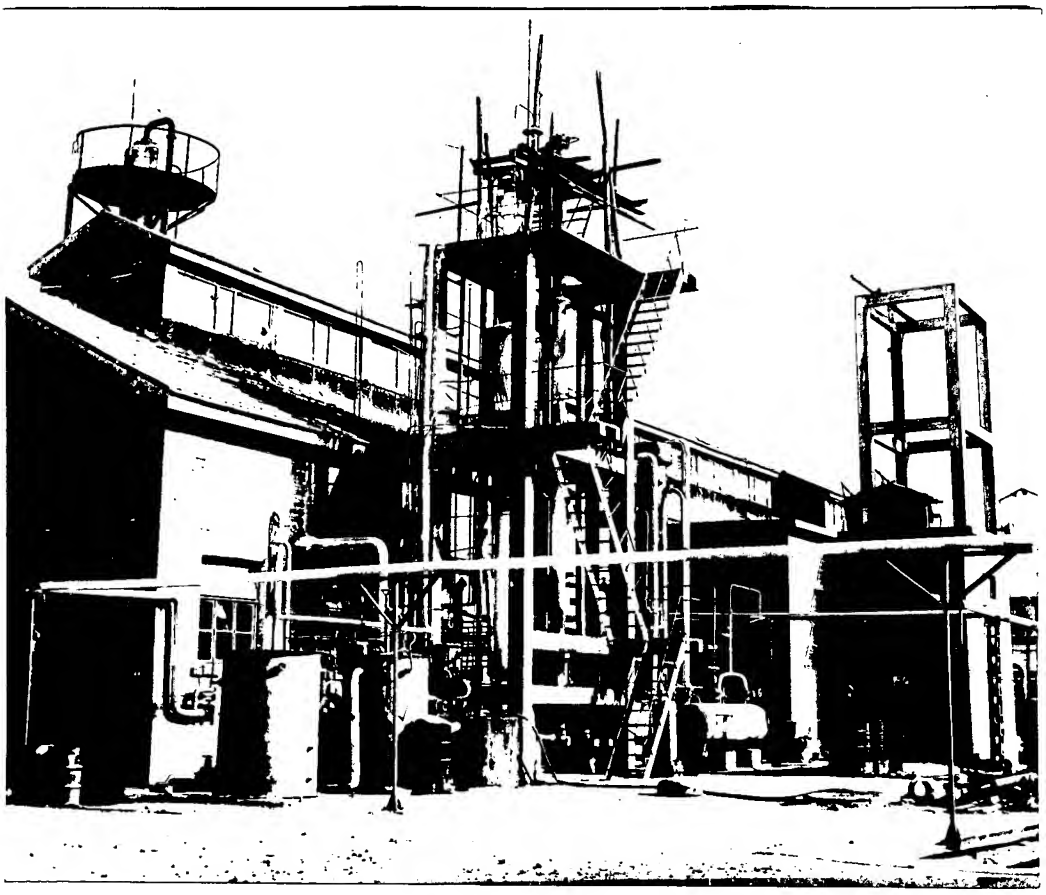

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